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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,276	01/21/2004	Min-soo Kim	249/444	1403
27849	7590	11/06/2007	EXAMINER	
LEE & MORSE, P.C. 3141 FAIRVIEW PARK DRIVE SUITE 500 FALLS CHURCH, VA 22042			LEBRON, JANNELLE M	
			ART UNIT	PAPER NUMBER
			2861	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/760,276

Applicant(s)

KIM ET AL.

Examiner

Jannelle M. Lebron

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1)  Responsive to communication(s) filed on 15 October 2007.
- 2a)  This action is FINAL.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4)  Claim(s) 1-40 is/are pending in the application.  
4a) Of the above claim(s) 9-18 and 27-35 is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1, 2, 19, 20, 36, 39 and 40 is/are rejected.
- 7)  Claim(s) 3-8, 21-26, 37 and 38 is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 21 January 2004 is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \*    c)  None of:
- Certified copies of the priority documents have been received.
  - Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 36, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0060704) in view of Fujimura et al. (US 6,726,312).

3. Suzuki et al. discloses a droplet ejector comprising:

- Claim 1:

a fluid path (16 in figs. 2A-3B) through which a fluid moves, a nozzle (32 in figs. 2A-3B) being formed on one end of the fluid path;

a volumetric structure (piezoelectric element 50) having a predetermined size (when not expanded) formed in communication with at least one surface that defines a portion of the fluid path (as seen in figs. 3A and 3B), the volumetric structure being sensitive to an external stimulus (voltage) and being capable of varying the predetermined size (expands, as seen in fig. 3B) to eject a droplet of the fluid through the nozzle (paragraph 0019; fig. 3B); and

a stimulus generator (polarizing device 70 in fig. 6) configured to generate and apply the stimulus to the volumetric structure to vary the predetermined size of the

volumetric structure (paragraph 0022) and to remove the stimulus to adjust the volumetric structure to the predetermined size (contract to its original size, wherein the droplet ejector is configured to eject the droplet of fluid upon application of the stimulus (paragraph 0019).

Thus Suzuki discloses all the claimed limitations as set forth above except, "in at least two directions simultaneously."

Fujimura et al. discloses an inkjet head that comprises an ink pressurizing chamber, an ink feed chamber and an ink feed passage that communicating between the previous two. When an electric field is applied to a piezoelectric element inside the ink chamber, it varies in size in two directions (as seen in fig. 8A, it expands in one direction and contracts in another) to eject an ink droplet (col. 13, lines 54-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Suzuki invention to include a piezoelectric that varies it's predetermined size in at least two directions simultaneously as taught by Fujimura for the purpose of changing the pressure inside the ink chamber and make a nozzle eject an ink droplet.

4. Suzuki further discloses a droplet ejector:

- Claim 2:

wherein the volumetric structure (50) expands in size to eject the droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to expand the size of the volumetric structure (paragraph 0019).

- Claim 36:

wherein the volumetric structure (50) exhibits a non-isotropic variation in size upon application of the stimulus.

- Claim 39:

wherein the volumetric structure (50) is configured to expand to a size greater than its original size (paragraph 0019).

- Claim 40:

wherein the volumetric structure (50) is configured to contract to its original size (when removing the stimuli).

5. Claims 1, 2, 36, 39 and 40 are further rejected under 35 U.S.C. 102(b) as being anticipated by Yasukawa et al. (US Patent 6,139,132) in view of Fujimura et al. (US 6,726,312).

6. Yasukawa et al. discloses a droplet ejector comprising:

- Claim 1:

a fluid path (pressurizing chamber 1) through which a fluid moves (ink), a nozzle (5 in figs. 1 and 2) being formed on one end of the fluid path;

a volumetric structure (piezoelectric element 11) formed in the fluid path and having a predetermined size (when not expanded), the volumetric structure being sensitive to an external stimulus (driving signal) and being capable of varying the predetermined size (expands) to eject a droplet of the fluid through the nozzle (col. 6, lines 3-34); and

a stimulus generator (that produces the driving signal) configured to generate and apply the stimulus to the volumetric structure to vary the predetermined size of the volumetric structure and to remove the stimulus to adjust the volumetric structure to the predetermined size (contract to its original size), wherein the droplet ejector is configured to eject the droplet of fluid upon application of the stimulus (col.6, lines 3-34).

Thus Yasukawa et al. discloses all the claimed limitations as set forth above except, "in at least two directions simultaneously."

Fujimura et al. discloses an inkjet head that comprises an ink pressurizing chamber, an ink feed chamber and an ink feed passage that communicating between the previous two. When an electric field is applied to a piezoelectric element inside the ink chamber, it varies in size in two directions (as seen in fig. 8A, it expands in one direction and contracts in another) to eject an ink droplet (col. 13, lines 54-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Yasukawa et al. invention to include a piezoelectric that varies it's predetermined size in at least two directions simultaneously as taught by Fujimura for the purpose of changing the pressure inside the ink chamber and make a nozzle eject an ink droplet.

- Claim 2:

wherein the volumetric structure (11) expands in size to eject the droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to expand the size of the volumetric structure (col.6, lines 3-34).

- Claim 36:

wherein the volumetric structure (11) exhibits a non-isotropic variation in size upon application of the stimulus (as seen in .

- Claim 39:

wherein the volumetric structure (50) is configured to expand to a size greater than its original size (col.6, lines 3-34).

- Claim 40:

wherein the volumetric structure (11) is configured to contract to its original size (when removing the stimuli).

7. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0060704) in view of Torgerson et al (US 2003/0122895).

8. Suzuki discloses an ink-jet printhead, comprising:

- Claim 19:

a substrate on which a manifold (44 in figs. 2A-3B) for supplying ink is formed;  
a barrier layer, which is stacked on the substrate and on which an ink chamber to be filled with ink to be ejected and an ink channel for providing communication between the ink chamber and the manifold are formed (as seen in figs. 2A-3B);

a volumetric structure (50), which is formed in a position where ink moves, the volumetric structure being sensitive to an external stimulus (voltage) and being capable of varying in size (expands) to eject the ink droplet through the nozzle (32; paragraph 0019); and

a stimulus generator (70 in fig.6), which applies a stimulus to the volumetric structure to vary a size of the volumetric structure (paragraph 0022).

- Claim 20:

wherein the volumetric structure (50) expands in size to eject the ink droplet through the nozzle (32), and the stimulus generator (70) applies the stimulus to the volumetric structure to expand the size of the volumetric structure (paragraph 0019).

Suzuki fails to teach:

- Claim 19:

a nozzle plate, which is stacked on the barrier layer and in which a nozzle, through which an ink droplet is ejected, is formed.

Torgerson et al. discloses an inkjet printhead (100 in fig. 3) comprising a nozzle plate (13 in fig.3) attached to the top of the ink barrier layer (12 in fig.13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Suzuki invention to include a nozzle plate stacked on the barrier layer as taught by Torgerson et al. for the purpose of defining the ink chambers and ink openings in a way that improves the printing quality.

***Allowable Subject Matter***



9. Claims 3-8, 21-26, 37 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for allowance for these claims is the inclusion of the limitations of a droplet ejector:

- Claim 3, 8 and 21:  
wherein the volumetric structure (26) is formed of stimulus sensitive hydrogel.
- Claim 37:  
wherein the two directions are orthogonal to each other.

It is these limitations, either alone or in combination as claimed that have not been taught, found, or suggested by prior art.

11. Claims 4-7, 21-26 and 38 are allowable subject matter due to their dependency on allowable claims.

### ***Response to Arguments***

12. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

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***Communication with the USPTO***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**Jannelle M. Lebron**  
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10/25/07

  
**MATTHEW LUU**  
SUPERVISORY PATENT EXAMINER